Lam Geotechnics Limited

Ground Investigation & Instrumentation Professionals

Ref : G1525/CS/L056/FEP-07/364/2009/A Date : 17 February 2016

Chun Wo - CRGL - MBEC Joint Venture

Unit 2803-2804, 28/F, Citicorp Centre, 18 Whitfield Road, North Point, Hong Kong

Attn: Mr. David Lau, Project Manager

Dear Sir,

Contract No. HY/2009/19 Central – WanChai Bypass Tunnel (North Point Section) and Island Eastern Corridor Link <u>Noise Management Plan (Rev. 4)</u>

Referring to the captioned information dated 13 February 2016 received through email on 17 February 2016, we have reviewed your submitted details and hereby certify the submission in accordance with Condition 2.9 of FEP-07/364/2009/A.

Should you have any enquiry, please feel free to contact the undersigned at 2839 5666.

Yours faithfully,

21

Raymond Dai Environmental Team Leader

<u>C.C.</u>

HyD	- Mr. Eddy Wu	(By Fax: 2714 5289)
CEDD	- Mr. Stephen Lo	(By Fax: 2577 5040)
AECOM	- Mr. Frankie Fan	(By Fax: 2587 1877)
Ramboll ENVIRON	- Mr. David Yeung	(By Fax: 3548 6988)

11/F, Centre Point, 181-185 Gloucester Road, Wanchai, Hong KongTel: (852) 2882-3939Fax: (852) 2882-3331Website: www.lamgeo.comEmail: info@lamgeo.com







By Post and Fax (2570 8013)





Ref.: AACWBIECEM00_0_7769L.16

17 February 2016

Chun Wo – CRGL – MBEC Joint Venture Unit 2803-2804 28/F, Citicorp Centre 18 Whitefield Road North Point, Hong Kong By Post and Fax (2570 8013)

Attention: Mr. David Lau

Dear Sir,

Re: Contract No. HY/2009/19 Central – Wan Chai Bypass – Tunnel (North Point Section) & Island Eastern Corridor Link <u>Noise Management Plan (Revision 4)</u>

Reference is made to your submission of the Noise Management Plan (Revision 4 dated 13 February 2016) to us through e-mail on 17 February 2016 for our review and comment.

Please be informed that we have no adverse comments on the captioned submission. We write to verify it in accordance with Condition 2.9 of FEP-07/364/2009/D.

Thank you for your kind attention.

Yours sincerely,

HyD

LAM

CEDD AECOM

David Yeung Independent Environmental Checker

c.c.

Mr. Eddy Wu Mr. Stephen Lo Mr. Frankie Fan Mr. Raymond Dai (ETL) by fax: 2714 5289 by fax: 2577 5040 by fax: 2587 1877 by fax: 2882 3331

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CONTRACT HY/2009/19

CENTRAL – WAN CHAI BYPASS – TUNNEL (NORTH POINT SECTION) AND ISLAND EASTERN CORRIDOR LINK

Noise Management Plan

(Pursuant to the Further Environmental Permit - No. FEP-07/364/2009/D)

Rev	4	Prepared and Reviewed By	Approved By:		
		2	- 0 /		
Date	13 Feb 2016	H2	Em toro		
Name		M.H. Isa	David Lau		
Designation		Environmental Officer	Site Agent		



REGISTRY OF NOISE MANAGEMENT PLAN AMENDED

Rev. No.	Amendment Date	Amendment Section	Content	Amended by
0	18 Mar 2011	All	Initial Revision incorporated ET and ICE comment	Simon Wong
		Appendix E	Construction Works Programme	
1	12 Sep 2011	Sections 8.0,10.0,11.0	Responses to comments (1) received from EPD	M.H. Isa
2	25 Oct 2011	Section 8.2	Movable / Temporary Noise Barrier	M.H. Isa
		Section 8.2	Movable / Temporary Noise Barrier	
		Section 11	Conclusion	
2	12 Mar 2012	Appendix G	Schedule for the Installation of Noise Barrier	MH Iso
5	15 Mar 2015	Appendix H	Specification of Noise Absorptive Material	MI.II. 18a
		Appendix I	Minutes of Meeting – Harbour Grand HK Hotel	
		Appendix J	Contract HY/2009/17 – FEHD Basement & Ground Floor Layout Plan	
		Section 1.0	Purpose of this Plan	
		Section 8.1	Restriction on the use of Pneumatic Breaker	
		Section 8.2	Temporary Noise Barrier	
4 13	13 Feb 2016	Appendix C	Plan and Sectional View of Typical Noise Barrier during Construction Phase	M.H. Isa
		Appendix D	Mitigation measures for the items of PME in each construction tasks	
		Appendix E	Specification of Noise Absorptive Material	
		Appendix F	Site Layout Plan	



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1.0 Purpose of this Plan

Pursuant to the Further Environmental Permit (No. FEP-07/364/2009/D), Part C, Special Condition, Clause 2.9, Noise Management Plan (NMP) is developed by Permit Holder (Chun Wo – CRGL - MBEC Joint Venture) to demonstrate clearly the management of construction noise nuisance generated in the execution of works for the Project. The mitigation measures specified in this NMP shall be implemented on site to reduce and/or minimise the nuisance to the publics and nearest noise sensitive receivers.

The purpose of this Plan is to update the latest noise barrier arrangement with respect to the reviewed construction sequence and alternative arrangement on the demolition and construction of substructure for the Island Eastern Corridor (IEC).

2.0 **Project Description**

This Project "Contract No. HY/2009/19 Central - Wan Chai Bypass – Tunnel (North Point Section) and Island Eastern Corridor Link" (HY/2009/19) is part of the CWB project, which shall provide relief to the existing congestion along the East-West corridor and cater for the anticipate growth of traffic on Hong Kong Island.

Scope of Works

The scope of the Project mainly includes:

- Construction of a 300-metre-long tunnel at North Point;
- Construction of an approach road to the tunnel;
- Modification of the section of Island Eastern Corridor between Hing Fat Street and Po Leung Kuk Yu Lee Mo Fan Memorial School;
- Modification of the junction of Victoria Park Road and Hing Fat Street;
- Demolition of Rumsey Street Flyover eastbound in Central;
- Sub-structure works of the East Ventilation Building and the foundation works of the Administration Building; and
- Associated works including landscaped deck, noise barriers, noise semi-enclosures, road drainage and landscaping works.

The site layout plan for the project as shown in Figure 6 refers in Appendix F.

3.0 Environmental Legislation, Policies, Plans, Standards and Criteria

Noise impacts have been assessed in accordance with the criteria and methodology given in the Technical Memoranda (TM) made under the Noise Control Ordinance (NCO) and the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).

The NCO provides the statutory framework for noise control. Assessment procedures and standards are set out in the following TM:

- EIAO-TM;
- TM on Noise from Construction Work other than Percussive Piling (GW-TM);
- TM on Noise from Construction Work in Designation Area (DA-TM); and
- TM on Noise from Places other than Domestic Premises, Public Places or Construction Sites (IND-TM).

The NCO provides the statutory framework for noise control of construction work other than percussive piling using Powered Mechanical Equipment (PME) between the hours of 1900 to 0700 or at any time on Sundays and a general holiday (that is, restricted hours). Noise control on construction activities taking place at other times is subject to the Criteria for evaluating Noise Impact stated in Table 1B of Annex 5 in the EIAO-TM. The noise limit is 75dB(A) $L_{eq(30 \text{ minutes})}$ at the facades of dwellings and 70 dB(A) $L_{eq(30 \text{ minutes})}$ at the facades of schools (65dB(A) during examination). The construction noise criteria are summarized in Table 3-1.

Table 3-1:	Daytime	Construction	Noise	Criteria
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Uses	Noise Level in Leq (30-minutes), dB(A)			
Domestic Premises	75			
Educational Institution	70			
Educational Institution (during examination)	65			

Between 1900 and 0700 hours and all day on Sundays and public holidays, activities involving the use of PME for the purpose of carrying out construction work is prohibited unless a Construction Noise Permit (CNP) has been obtained. A CNP may be granted provided that the Acceptable Noise Level (ANL) for the Noise Sensitive Receivers (NSRs) can be compiled with. ANLs are assigned depending upon the Area Sensitivity Ratings (ASRs). The corresponding Basic Noise Levels (BNLs) for evening and night time periods are given in Table 3-2.

Time Period	Basic Noise Levels (BNLs)					
Time T erioù	ASR A	ASR B	ASR C			
Evening (1900 to 2300 hours)	60	65	70			
Night (2300 to 0700 hours)	45	50	55			

Table 3-2: Construction Noise Criteria for Activity other than Percussive Piling

4.0 Noise Sensitive Receivers (NSRs)

In order to evaluate the construction noise impacts from the Project, representative existing NSRs of the Project are identified in the EIA (AEIAR-125/2008), and are summarized in Table 4-1. The location plan of the NSRs is shown in Figure 1 in **Appendix A**.

NSR	Section	Location	Use
N9		Viking Garden	
N10		Victoria Court	
N11		Mayson Garden	
N12		Gordon House	
N13	Tin Hau	Belle House	
N14	Hoi Tao Building Staff Quarters of FEHD		Residential
N15			
N16		Victoria Centre	
N17	Harbour Heights		
N18	City Garden, Block 10		
N19	City Garden, Block 7		
N20]	HK Baptist Church Henrietta Sec. School	Educational Institution
N21	North Point	Provident Centre, Blk 1	
N22	Provident Centre, Blk 6		Residential
N23		Provident Centre, Blk 17	
N24 [*]		PLK Yu Lee Mo Fan Memorial School	Educational Institution

 Table 4-1: Representative Existing Noise Sensitive Receivers

Note: * Not being identified as representative NSR in the EIA.

5.0 Identification of Noise Impacts

Potential noise impacts of the Project are likely arise from the following activities:

- Diaphragm wall and tunnel construction;
- Substructure and superstructure for landscape deck, connection of Island Eastern Corridor (IEC) Link;
- Demolition of superstructure, including the IEC structure; and
- Road formation, earth works, drainage culvert construction

6.0 Assessment Methodology

In accordance with the EIAO, the methodology outlined in the GW-TM has been used for the assessment of construction noise (excluding percussive piling). Sound Power Levels (SWLs) of the equipment were taken from Table 3 of this TM.

A negative correction of 10dB(A) was made to the calculated result by eliminating the line of sight from the receivers along the construction areas.

A positive correction of 3dB(A) was made to the calculated result in order to allow for façade effect.

7.0 Prediction and Evaluation of Noise Impacts

In accordance with the EIA (AEIAR-125/2008), exceedences of the construction noise criteria as stated in Table 3-1 are predicted at representative NSRs in the absence of mitigation measures. A summary of the unmitigated construction noise levels of the representative NSRs during normal daytime working hours within the construction period of the Project is summarized in Table 7-1.

Table 7-1: Summary of Unmitigated Construction Noise Level at Representative NSRs during Normal Daytime Working Hours

Representative NSRs	Predicted Unmitigated Construction Noise Levels during Normal Daytime Working Hour (L _{eq (30-minutes)} dB(A))
N11	57 - 101
N13	60 - 84
N15	66 - 88
N17	63 - 96
N18	62 - 98
N20 [#]	65 - 90
N22	64 - 79

Note: # For normal daytime working hours, the noise criteria are 70 dB(A) and 65 dB(A) for normal teaching periods and examination periods, respectively.

Noise mitigation measures should therefore be required to reduce noise levels to the stipulated standard.

8.0 Mitigation of Adverse Environmental Impacts

In order to reduce the noise impacts to NSRs during normal daytime working hours, it is recommended that the following noise reduction measures shall be strictly implemented during the construction phase.

8.1 Restriction on the use of Pneumatic Breaker

At the planning stage it was anticipated that pneumatic breakers may be used for the demolition of the existing IEC and therefore it's restriction was laid down as below.

The use of pneumatic breakers, if required to demolish the existing IEC, shall be confined to the period from 0900 to 1700 hours on weekdays (Monday to Friday), and the pneumatic breakers shall not be used any time on Saturdays, Sundays and general holidays, and during examination hours of the schools affected by the works site, including:

- (1) HK Baptist Church Henrietta Secondary School;
- (2) PLK Yu Lee Mo Fan Memorial School

To ensure no pneumatic breakers shall be used during the examination period, CW-CRGL-MBEC JV shall:

- closely liaise with the schools to address their environmental concerns during the course of construction works;
- check the examination schedule and re-schedule the works during the examination period, where practicable, to avoid noise nuisance to the students; and
- join the briefing sessions / visits held by Highway Department or the Engineer to the schools to provide them more updating information about the upcoming construction activities of the Project.

8.2 Temporary Noise Barrier

Due to the latest noise barrier arrangement with respect to the reviewed construction sequence and alternative arrangement on the demolition and construction of substructure for the Island Eastern Corridor (IEC) as mentioned above in Section 1.0, different types of noise barriers will be installed for particular items of powered mechanical equipment (including saw cutting / wire cutting machines) and construction works at the locations as shown in Figure 2 refer in **Appendix B**. These noise barriers shall be installed along the existing Island Eastern Corridor (IEC) during the demolition and construction of substructure for the IEC and construction of adjacent tunnel approach ramp structure, as shown in Figure 2 refer in **Appendix B**. Besides, temporary noise barriers shall be provided on temporary working platforms on piers or pile caps for the demolition works of existing piers and crossheads for the marine section of the existing IEC as shown in Figure 3 refer in **Appendix B**. The barrier material shall have a surface mass of not less than 14 kg/m² on skid footing with 25mm thick internal sound absorptive lining.

Movable noise barriers will be used for static plant, such as generator, air compressor and concrete pump and / or truck as well as Powered Mechanical Equipment (PME) such as crawler crane where appropriate. The barrier material shall have a surface mass of not less than 14 kg/m² with sound

absorptive lining to achieve the maximum screening effect. We would <u>exhaust all practicable</u> <u>mitigation measures</u> as required in TM-EIAO in order to minimize the construction noise impact to nearby residents including the use of movable noise barriers. Plan and sectional view of movable noise barrier for static plants/PME to be placed during the construction phase are shown in **Appendix C**.

The noise assessment based on the latest construction sequence and PME grouping can be referred to in **Appendix D**.

Noise absorptive material used in noise barriers can be referred to in Appendix E.

8.3 Quality Powered Mechanical Equipment (QPME)

The following types of QPME are proposed to be used during the construction phase of the Project:

- Bulldozer, wheeled
- Excavator, wheeled / tracked
- Loader, wheeled
- Road roller
- Power rammer (petrol)
- Crane, mobile
- Bulldozer, tracked
- Loader, tracked
- Asphalt paver
- Roller, vibratory
 - Compactor, vibratory
 - Generator

8.4 Good Site Practices

The following good site practices should be adopted to further ameliorate the impacts:

•

- Only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the construction program;
- Silencers or mufflers on construction equipment shall be utilized and shall be properly maintained during the construction program;
- Mobile plant, if any, shall be sited as far away from NSRs as applicable;
- Machines and plant (such as trucks) that may be in intermittent use must be shut down between works periods or shall be throttled down to a minimum;
- Plant known to emit noise strongly in one direction shall, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and
- Material stockpiles and other structures shall be effectively utilized, wherever practicable, in screening noise from on-site construction activities.
- The use of Quality Powered Mechanical Equipment (QPME) plant as far as practicable
- Exhaust all practicable mitigation measures to minimize noise impact the Noise Sensitive Receivers.

8.5 Multi-Phase Construction

Proactive planning of working sequences for multi-phase construction could minimize the total sound power levels generated by PMEs during normal daytime working hours.

PME grouping as noise mitigation measures shall be implemented at NSR N11, N13, N17, N18 and N20. In order to minimize the noise impact to the surrounding NSRs, only one group of PME shall be operated at any one time during construction.

Detailed list of PME and specific noise impact of individual construction work shall be reviewed in relevant method statement via submission to the Engineer.

9.0 Evaluation of Mitigated Noise Impacts

With the implementation on use of QPME, temporary noise barriers and PME grouping, the overall noise levels at NSRs shall be reduced by 7 to $31dB(A) L_{eq(30-minutes)}$, depending on the type of construction activities. With the exception of NSRs N11, N17, N18 and N20, the predicted construction noise levels arising from the Project at all other NSRs selected for noise impact assessment shall comply with the EIAO-TM construction noise criteria. A summary for mitigated noise levels during normal daytime working hours at representative NSRs is shown in Table 9-1.

 Table 9-1:
 Summary of Mitigated Construction Noise Levels at Representative NSRs during Normal Daytime Working Hours

Representative NSRs	Predicted Mitigated Construction Noise Levels
	$(\mathbf{L}_{eq(30-minutes)} \mathbf{dB}(\mathbf{A}))$
N11	44 – 70 (Group 1 PME)
N11	51 – 85 (Group 2 PME)
N13	55 – 71 (Group 1 PME)
N13	55 – 71 (Group 2 PME)
N15	62 – 75
N17	58 – 80 (Group 1 PME)
N17	58 – 80 (Group 2 PME)
N18	54 – 84 (Group 1 PME)
N18	54 – 84 (Group 2 PME)
N20 [#]	60 – 77 (Group 1 PME)
N20 [#]	60 - 77 (Group 2 PME)
N22	62 - 72

Note: # For normal daytime working hours, the noise criteria are 70 dB(A) and 65 dB(A) for normal teaching periods and examination periods, respectively.

In according to the EIA (AEIAR-125/2008), the on-site survey has revealed that NSR N20 (HK Baptist Church Henrietta Secondary School) has already been noise insulated with air-conditioners. With the provision of air-conditioners, it is considered that the noise impact shall be minimized by keeping the windows closed during the construction activities. Notwithstanding this, due to a limited

buffer distance and a more stringent noise criterion of 65 dB(A), it is proposed that particularly noisy construction activities, especially those associated with the demolition of the ICE structures, shall be scheduled to avoid examination periods as far as practicable.

10.0 Impact Monitoring during Construction

External Monitoring

Environmental Monitoring and Audit (EM&A) Manual serves as a guideline to set up of an EM&A programme to ensure compliance with the EIA study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action.

The Environmental Team Leader and his team member shall be responsible for the set-up, implement and maintain of EM&A system. The real-time on-site monitoring of noise level around the work sites areas shall be carried out by Environmental Team during the construction phase.

The monitoring station(s) may subject to change with respect to the availability of the measurement location and/or other related factors. The relevant location(s) should refer to the latest EM&A Manual via the Project website at the below link:

http://www.wd2-cwb.com/documents/manual/htm.

Remedy mitigation measures shall be immediately implemented once the construction noise level exceeded the limit and action levels under the Manual's requirement.

11.0 Conclusion

(1) The predicted unmitigated noise level shall range from 57 to 101 dB(A) at the respectively NSRs. With the use of QPME, temporary / movable noise barriers and PME grouping for construction tasks under the Project, the noise levels at the NSRs selected for construction noise impact assessment except N11, N17, N18 and N20 shall comply with the construction noise standard.

Having exhausted practicable noise mitigation measures, the predicted noise level at N11 (i.e Mayson Garden) shall exceed the noise standard of 75dB(A) by 10 dB(A) with Group 2 PME. For N17 (i.e Harbour Heights), the predicted noise level shall exceed the noise standard of 75 dB(A) by up to 5 dB(A) with Group 1 or Group 2 PME. For N18 (i.e City Garden), the predicted noise level shall exceed the noise standard of 75 dB(A) by up to 9 dB(A) with Group 1 or Group 2 PME. For N20 (i.e HK Baptist Church Henrietta Secondary School), the predicted noise level with Group 1 or Group 2 PME shall exceed the noise standard of 65 dB(A) by up to

12 dB(A) for Group 1 or Group 2 PME during examination periods. For the normal teaching period, the noise level shall exceed the noise standard of 70 dB(A) by 7 dB(A) with Group 1 or Group 2 PME. However, the school has been noised insulated with air conditioners and, by keeping the windows closed during construction activities, noise impacts at the indoor environment can be avoided. Notwithstanding this, the particularly noisy construction activities shall be scheduled to avoid examination period as far as practicable.

Whilst the prediction does indicate some noise exceedance for limited periods of time, even with the consideration of all practicable mitigation measures, during the actual construction period as much as practically possible shall be done to reduce construction noise still further, and there shall be on-going liaison with all concerned parties and site monitoring to deal with and minimize any exceedances. Community Liaison Group (CLG) will facilitate communication, enquires and complaint handling on all environmental issues. Regular meeting will be setup for the CLG to update the latest cumulative environmental impact due to the project.

Nonetheless, as mentioned above, the erection of movable noise barrier where allowable, at localized location as a possible noise mitigation measures will minimizes any noise impact to the sensitive receivers in the construction stage.

This Noise Management Plan will be revised regularly to reflect changes if any.



NOISE MANAGEMENT PLAN

For

Contract No.: HY/2009/19

Central – Wan Chai Bypass Tunnel (North Point Section) and Island Eastern Corridor Link

Appendix A

Location Plan for Noise Sensitive Receiver





NOISE MANAGEMENT PLAN

For

Contract No.: HY/2009/19

Central – Wan Chai Bypass Tunnel (North Point Section) and Island Eastern Corridor Link

Appendix B

Location Plan of Temporary Noise Barrier during Construction Phase in North Point Waterfront and during the Demolition of Existing Piers and Crossheads in Marine Section of IEC







NOISE MANAGEMENT PLAN

For

Contract No.: HY/2009/19

Central – Wan Chai Bypass Tunnel (North Point Section) and Island Eastern Corridor Link

Appendix C

Plan and Sectional View of Typical Noise Barrier during Construction Phase



Central - Wan Chai Bypass – Tunnel (North Point Section) and Island Eastern Corridor Link Noise Management Plan – Revision 0

Section View of Temporary Noise Barrier



Temporary Noise Barrier comprised of a surface mass of not less than 14 kg/m^2 on skid footing with 25mm thick internal sound absorptive lining backing with a cantilevered upper portion located within 5m from any static plant. The PME shall be totally screened when viewed from the NSR.

Plan View of Temporary Noise Barrier



Static plant that shall be totally screened when viewed from the NSR



NOISE MANAGEMENT PLAN

For

Contract No.: HY/2009/19

Central – Wan Chai Bypass Tunnel (North Point Section) and Island Eastern Corridor Link

Appendix D

Mitigation Measures for Powered Mechanical Equipment (PME) for the different Construction Tasks during Normal Daytime Working Hours



Powered Mechanical Equipment (PME) for Different Construction Tasks during Normal Daytime Working Hours (With Mitigation Measures)

NSR: N18 City Garden, Block 10

Section 6.0 Construction of IECL

6.2 IEC Connection Work

6.2A Substructures (Group 1 and 2 PME)

	TM Ref.			On-time		Total SWL	
Powered Mechanical Equipment (PME)	Identification	SWL	Quantity	%	Reduction	(dB(A))	
	Code	(dB(A))					
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0	1.995E+10
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5	4.467E+09
Crane, mobile (diesel)	Table C7/114	101	2	70%	5	97.5	5.623E+09
Air Compressor	Table C7/16	96	1	100%	5	91.0	1.259E+09
Excavator, wheeled/tracked	Table C3/97	105	1	70%	5	98.5	7.079E+09
Water pump (electric)	CNP 281	88	2	100%	5	86.0	39810717
Concrete Pump	Table C6/35	100	0	100%	5	0.0	(
Piling, large diameter bored, oscillator	CNP 165	115	1	100%	5	110.0	1E+11
						111.4	

6.2A Substructures (Group 1 PME)

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))	
Concrete lorry mixer	Table C6/35	100	1	70%	0	98.5	7.079E
Poker, vibratory, hand-held	Table C6/32	100	1	70%	5	93.5	2.239E
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5	2.818E
Air Compressor	Table C7/16	96	1	100%	5	91.0	1.259E
Concrete Pump	Table C6/35	100	0	100%	5	0.0]
						101.3]

6.2A Substructures (Group 2 PME)

	TM Ref.			On-time		Total SWL	×
Powered Mechanical Equipment (PME)	Identification Code	SWL (dB(A))	Quantity	%	Reduction	(dB(A))	
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5	2.818E
Excavator, wheeled/tracked	Table C3/97	105	1	50%	5	97.0	5.012E
Water pump (electric)	CNP 281	88	1	100%	5	83.0	199526
Piling, large diameter bored, oscillator	CNP 165	115	1	100%	5	110.0	1E
						110.3	

6.2B Superstructures

	TM Ref.			On-time		Total SWL	
Powered Mechanical Equipment (PME)	Identification	SWL	Quantity	%	Reduction	(dB(A))	
	Code	(dB(A))					
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0	1
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5	- 4
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5	2
Air Compressor	Table C7/16	96	0	100%	5	0.0	1
Excavator, wheeled/tracked	Table C3/97	105	0	70%	5	0.0	1
Water pump (electric)	CNP 281	88	0	100%	5	0.0	
Concrete Pump	Table C6/35	100	0	100%	5	0.0	
Bar Bender	CNP 021	90	0	100%	5	0.0	
						104.4	-

995E+10 467E+09 818E+09

0 0 0

0

Powered Mechanical Equipment (PME) for Different Construction Tasks during Normal Daytime Working Hours (With Mitigation Measures)

NSR: N18 City Garden, Block 10

6.2B Superstructures (For Marine Works)

Demond Machanical Environment (DME)	TM Ref.	014/1	Quantitu	On-time	Poduction	Total SWL	×
Powered Mechanical Equipment (PME)	Code	(dB(A))	Quantity	%	neuluction	(0B(A))	
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0	1.995E+10
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5	4.467E+09
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5	2.818E+09
Air Compressor	Table C7/16	96	0	100%	5	0.0	0
Excavator, wheeled/tracked	Table C3/97	105	0	70%	5	0.0	0
Water pump (electric)	CNP 281	88	0	100%	5	0.0	0
Concrete Pump	Table C6/35	100	0	100%	5	0.0	0
Bar Bender	CNP 021	90	0	100%	5	0.0	0
Tug boat	CNP 221	110	1	50%	0	107.0	5.012E+10
Barge	-	0	1	100%	0	0.0	0
						104.4	

6.2C Demolition of Structure (For IEC E/B)

	TM Ref.			On-time		Total SWL	
Powered Mechanical Equipment (PME)	Identification	SWL	Quantity	%	Reduction	(dB(A))	
Generator, silenced, 75dB(A) at 7m	CNP 102	100	1	100%	10	90.0	1E+0
Electric Motor On Launching Girder		95	5	100%	5	97.0	5.012E+0
Concrete corer	CNP 042	117	1	100%	10	107.0	5.012E+1
Saw, wire	CNP 205	101	1	100%	5	96.0	3.981E+0
Cutter, circular, steel (electric)	CNP 056	112	1	100%	5	107.0	5.012E+1
Crane, mobile (diesel)	Table C7/114	101	2	100%	5	99.0	7.943E+0
						110.7	

6.2C Demolition of Structure (For IEC W/B)

<u> </u>	TM Ref.			On-time		Total SWL	<u>`</u>
Powered Mechanical Equipment (PME)	Identification Code	SWL (dB(A))	Quantity	%	Reduction	(dB(A))	
Generator, silenced, 75dB(A) at 7m	CNP 102	100	1	100%	10	90.0	1E+(
Electric Motor On Launching Girder		95	5	100%	5	97.0	5.012E+(
Concrete corer	CNP 042	117	1	100%	10	107.0	5.012E+1
Saw, wire	CNP 205	101	1	100%	5	96.0	3.981E+(
Cutter, circular, steel (electric)	CNP 056	112	1	100%	5	107.0	5.012E+1
Crane, mobile (diesel)	Table C7/114	101	2	100%	5	99.0	7.943E+(
						110.7	1

6.2C Demolition of Structure (For IEC E/B) (For Marine Works)

	TM Ref.			On-time		Total SWL	
Powered Mechanical Equipment (PME)	Identification	SWL	Quantity	%	Reduction	(dB(A))	
	Code	(dB(A))					
Generator, silenced, 75dB(A) at 7m	CNP 102	100	1	100%	10	90.0	1E+0
Electric Motor On Launching Girder		95	5	100%	5	97.0	5.012E+0
Concrete corer	CNP 042	117	1	100%	10	107.0	5.012E+1
Saw, wire	CNP 205	101	1	100%	5	96.0	3.981E+0
Cutter, circular, steel (electric)	CNP 056	112	1	100%	5	107.0	5.012E+1
Tug boat	CNP 221	110	1	50%	0	107.0	5.012E+1
Barge	-	0	1	100%	0	0.0	
						112.1	

Powered Mechanical Equipment (PME) for Different Construction Tasks during Normal Daytime Working Hours (With Mitigation Measures)

NSR: N18 City Garden, Block 10

6.2C Demolition of Structure (For IEC W/B) (For Marine Works)

	TM Ref.			On-time		Total SWL	
Powered Mechanical Equipment (PME)	Identification	SWL	Quantity	%	Reduction	(dB(A))	
	Code	(dB(A))					
Generator, silenced, 75dB(A) at 7m	CNP 102	100	1	100%	10	90.0	1E+09
Electric Motor On Launching Girder		95	5	100%	5	97.0	5.012E+09
Concrete corer	CNP 042	117	1	100%	10	107.0	5.012E+10
Saw, wire	CNP 205	101	1	100%	5	96.0	3.981E+09
Cutter, circular, steel (electric)	CNP 056	112	1	100%	5	107.0	5.012E+10
Tug boat	CNP 221	110	1	50%	0	107.0	5.012E+10
Barge	-	0	1	100%	0	0.0	0
						112.1	

6.3 East Portal and IEC Connection Work

6.3.1 Substructures

	TM Ref.			On-time		Total SWL	×
Powered Mechanical Equipment (PME)	Identification	SWL	Quantity	%	Reduction	(dB(A))	
	Code	(dB(A))					
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0	1.995E+
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5	4.467E+
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5	2.818E+
Air Compressor	Table C7/16	96	0	100%	5	0.0	
Excavator, wheeled/tracked	Table C3/97	105	2	70%	5	101.5	1.413E+
Water pump (electric)	CNP 281	88	6	100%	10	85.8	3801893
Concrete Pump	Table C6/35	100	2	100%	5	98.0	6.31E+
Piling, large diameter bored, oscillator	CNP 165	115	0	100%	5	0.0	
						106.8	

6.3.2 Retaining Structures

	TM Ref.			On-time		Total SWL	
Powered Mechanical Equipment (PME)	Identification	SWL	Quantity	%	Reduction	(dB(A))	
	Code	(dB(A))					
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0	1.995E+10
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5	4.467E+09
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5	2.818E+09
Air Compressor	Table C7/16	96	0	100%	5	0.0	(
Excavator, wheeled/tracked	Table C3/97	105	2	70%	5	101.5	1.413E+10
Water pump (electric)	CNP 281	88	6	100%	10	85.8	380189396
Concrete Pump	Table C6/35	100	2	100%	5	98.0	6.31E+09
Piling, large diameter bored, oscillator	CNP 165	115	1	100%	5	110.0	1E+11
						111.7	1 481E+11

6.3.3 Demolition of Structure

	TM Ref.			On-time		Total SWL	×
Powered Mechanical Equipment (PME)	Identification Code	SWL (dB(A))	Quantity	%	Reduction	(dB(A))	
Breaker, excavator mounted	Table C8/13	110	1	70%	5	103.5	2.239E+10
Excavator, wheeled/tracked	Table C3/97	105	0	80%	5	0.0	1
Breaker, hand-held, mass > 20kg and < 35kg	Table C2/10	110	0	100%	5	0.0	1
Dump truck, 5.5 tonne < gross vehicle weight < 38 tonne	Table C9/27	105	1	70%	0	103.5	2.239E+10
Crane, mobile (diesel)	Table C7/114	101	1	100%	5	96.0	3.981E+09
						106.9	4.876E+10



Powered Mechanical Equipment (PME) for Different Construction Tasks during Normal Daytime Working Hours (With Mitigation Measures)

NSR: N18 City Garden, Block 10

9.0 Tunnel Building and Installation

9.0 Tunnel Building and Installation at East Ventilation Building, Administration Building & Central Ventilation Building, West Ventilation 9.0A Substructures

	TM Ref.			On-time		Total SWL	×
Powered Mechanical Equipment (PME)	Identification	SWL	Quantity	%	Reduction	(dB(A))	
	Code	(dB(A))					
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0	1.995E+10
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5	4.467E+09
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5	2.818E+09
Air Compressor	Table C7/16	96	1	100%	5	91.0	1.259E+09
Drill rig, rotary type (diesel)	CNP 072	110	2	100%	5	108.0	6.31E+10
Water pump (electric)	CNP 281	88	2	100%	10	81.0	125892541
Grout mixer	CNP 105	90	1	100%	5	85.0	316227766
Concrete Pump	Table C6/35	100	0	100%	5	0.0	0
Piling, large diameter bored, oscillator	CNP 165	115	0	100%	5	0.0	0
						109.6	9.203E+10

9.0B Superstructures

	TM Ref.			On-time		Total SWL	·
Powered Mechanical Equipment (PME)	Identification	SWL	Quantity	%	Reduction	(dB(A))	
	Code	(dB(A))					
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0	1.995E+10
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5	4.467E+09
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5	2.818E+09
Air Compressor	Table C7/16	96	1	100%	5	91.0	1.259E+09
Drill rig, rotary type (diesel)	CNP 072	110	2	100%	5	108.0	6.31E+10
Water pump (electric)	CNP 281	88	2	100%	10	81.0	125892541
Grout mixer	CNP 105	90	1	100%	5	85.0	316227766
Concrete Pump	Table C6/35	100	0	100%	5	0.0	0
Piling, large diameter bored, oscillator	CNP 165	115	0	100%	5	0.0	0
						109.6	9.203E+10

Reference No. 2 - Comparison of Predicted Construction Noise Level with EIA Appendix 4.14 at N18 City Garden, Block 10 with Group 1 PME

Predicted Construction Noise Levels, dB(A)		SWL	Distance	2																									
N18 City Garden, Block 10 with Group 1 PME		dB(A)	(m)	20	14				2	2015								2016							-	2017			
				10 1	11 12	2 1	2 3	3 4	5	6 7	8	9 10) 11	12 1	2	3 4	5	6 7	8	9 10	11 12	1	2	3 4	5	6 7	8	9 10	11 12
6.0 Construction of IECL																													
6.2 IEC Connection Work																													
6.2A Substructures	NPR1	111	255	5					•		•	•				Co	mplete	d					-			•			
6.2B Superstructures	NPR1	104	255	5												Сс	mplete	d											
6.2A Substructures	NPR2E(EB)	111	68	3												Сс	mplete	d											
6.2B Superstructures	NPR2E(EB)	104	68	3												Сс	mplete	d											
Reconstruction IEC West Bound																													
6.2C Demolition of Structure	WB(section 2,(45m in length land section))	111	16	5			82																						
5.2C Demolition of Structure	WB(other than section 2)	111	37	7	75 75	5 75																							
5.2C Demolition of Structure	WB(section 2,(70m in length marine section))	112	16	5			83	3																					
5.2C Demolition of Structure	WB(other than section 2)	112	70)				70																					
5.2A Substructures	WB(Group 1 PME) land section	110	34	ŀ			74	1																					
5.2A Substructures	WB(Group 1 PME) marine section	112	50)												Сс	mplete	d											
5.2B Superstructures	WB(other than section B land section)	104	23	3										72 72	72 ′	72 72	72 7	2 72	72	72 72									
5.2B Superstructures	WB(section B,(20m in length land section))	104	20)									73																
5.2B Superstructures	WB(other than section B marine section)	110	30)					75 7	5 75	75 7	75																	
5.2B Superstructures	WB(section B,(20m in length marine section))	110	20)								79)																
5.2C Demolition of Structure	EB(section 5,(150m in length land section))	111	30)																	76								
5.2C Demolition of Structure	EB(other than section 5 land section)	111	150)																	62								
5.2C Demolition of Structure	EB(section 5,(150m in length marine section))	112	30)																		77							
5.2C Demolition of Structure	EB(other than section 5 marine section)	112	160)																		(63 6	53					
5.2A Substructures	EB(Group 1 PME) marine section	112	50)												Сс	mplete	d											
5.2B Superstructures	EB marine section	110	50)												Сс	mplete	d											
5.3 East Portal and IEC Connection Work																													
5.3.1 Substructures		107	34	ŀ																		,	71 7	71					
5.3.2 Retaining Structures	48m away from NSR18	112	48	3																				73	73 7	73 73			
5.3.2 Retaining Structures	34m closest distance	112	34	Ļ																							76		
5.3.3 Demolition of Structure	34m closest distance	107	34	-																							76		
0.0 Tunnel Building & Installation																													
0.0 Tunnel Building & Installation at East Ventilation Building, Administration 1	Bulding, &																												
Central Ventilation Building, West Ventilation Building																													
0.0A Substructures	Admin B.	110	40)																	73								
9.0B Superstructures	Admin B.	110	40)																	73	73							
Predicted Construction Noise Level, dB(A)(with Façade Effect)			_	7	75 75	5 75	82 84	1 70	75 7	5 75	75 7	75 79	73	72 72	72 ′	72 72	72 7	72 72	72	72 72	73 78	79	72 7	72 73	73 7	73 73	76		
Predicted Construction Noise Level in EIA report for same construction work. dl	B(A)(with Facade Effect)				75 75	5 75	82 84	1 7/	75 7	5 75	75 7	75 70	76	75 75	75 ′	75 75	75 7	75 75	75	75 75	75 80	82 '	71 1	74 75	75 7	75 75	77 7	71 71	71 7

Reference No. 3 - Comparison of Predicted Construction Noise Level with EIA Appendix 4.14 at N18 City Garden, Block 10 with Group 2 PME

Predicted Construction Noise Levels, dB(A)		SWL Di	stance																											
N18 City Garden, Block 10 with Group 2 PME		dB(A)	(m)	201	4				20	15								2016								201	7			
				10 1	1 12	1	2 3	3 4	5 6	7	8 9	10	11 1	2 1	2	3	4 5	6 7	7 8	9	10 1	1 12	1	2 3	4	5 6	7 8	3 9	10 11	1 12
6.0 Construction of IECL																														
6.2 IEC Connection Work																														
6.2A Substructures	NPR1	111	255													С	omplete	ed												
6.2B Superstructures	NPR1	104	255													С	omplete	ed												
6.2A Substructures	NPR2E(EB)	111	68													С	omplete	ed												
6.2B Superstructures	NPR2E(EB)	104	68													С	omplet	ed												
Reconstruction IEC West Bound																														
6.2C Demolition of Structure	WB(section 2,(45m in length land section))	111	16			8	32																							
6.2C Demolition of Structure	WB(other than section 2)	111	37	7	5 75	75																								
6.2C Demolition of Structure	WB(section 2,(70m in length marine section))	112	16				83	3																						
6.2C Demolition of Structure	WB(other than section 2)	112	70					70																						
6.2A Substructures	WB(Group 2 PME) land section	110	34				74	4																						
6.2A Substructures	WB(Group 2 PME) marine section	112	50													С	omplet	ed												
6.2B Superstructures	WB(other than section B land section)	104	23										7	2 72	72 7	72 7	2 72	72 72	2 72	72	72									
6.2B Superstructures	WB(section B,(20m in length land section))	104	20										73																	
6.2B Superstructures	WB(other than section B marine section)	110	30						75 75	75 7	75 75																			
6.2B Superstructures	WB(section B,(20m in length marine section))	110	20									79																		
6.2C Demolition of Structure	EB(section 5,(150m in length land section))	111	30																			76								
6.2C Demolition of Structure	EB(other than section 5 land section)	111	150																		6.	2								
6.2C Demolition of Structure	EB(section 5,(150m in length marine section))	112	30																				77							
6.2C Demolition of Structure	EB(other than section 5 marine section)	112	160																				6	63 63						
6.2A Substructures	EB(Group 2 PME) marine section	112	50													С	omplet	ed												
6.2B Superstructures	EB marine section	110	50													С	omplet	ed												
6.3 East Portal and IEC Connection Work																														
6.3.1 Substructures		107	34																				7	1 71						
6.3.2 Retaining Structures	48m away from NSR18	112	48																						73 7	73 73	73			
6.3.2 Retaining Structures	34m closest distance	112	34																								76	5		
6.3.3 Demolition of Structure	34m closest distance	107	34					71																			76	5		
9.0 Tunnel Building & Installation																														
9.0 Tunnel Building & Installation at East Ventilation Building, Administration Bulding, &																														
Central Ventilation Building, West Ventilation Building																														Γ
9.0A Substructures	Admin B.	110	40																		7	3								T
9.0B Superstructures	Admin B.	110	40																			73	73							1
Predicted Construction Noise Level, dB(A)(with Façade Effect)				7	5 75	75 8	82 84	4 74	75 75	75 7	75 75	79	73 7	2 72	72	72 7	2 72	72 72	2 72	72	72 7	3 78	79 7	2 72	73 7	73 73	73 76	5		T
Predicted Construction Noise Level in EIA report for same construction work. dB(A)(with F	açade Effect)			7	5 75	75 8	32 84	4 74	75 75	75 7	75 75	79	76 7	5 75	75 7	75 7	5 75	75 75	5 75	75	75 7	5 80	82 7	4 74	75 7	75 75	75 77	7 71	71 71	1 7



NOISE MANAGEMENT PLAN

For

Contract No.: HY/2009/19

Central – Wan Chai Bypass Tunnel (North Point Section) and Island Eastern Corridor Link

Appendix E

Specification of Noise Absorptive Material





15 JUL 2010

RESPONSE TO CONTRACTOR'S SUBMISSION

Our Ref. : CWB/(HY/2009/17)/M25/110/17B000514

To : Lam Woo & Co., Ltd.	Attn. : Mr. Daniel Chan							
Location : Aesthetic Panel (Type 1)	CSF No. : CMS	/C&S/014/2						
Title of Submission : NoiseAbsorptiveMaterial–(OriginatedRockwool for Aesthetic Panelfrom Contractor)(Type 1)	Rev.: N/A	Date: 12 July 2010						
The Engineer's Representative's Comment(s) :		· · · · · · · · · · · · · · · · · · ·						
Your submission ref: CMS/C&S/014/2, dated 13 July 2010 and	d received on 13	July 2010 refers.						
I have no objection to the use of "IAC" Acoustic Panel (Stand Aesthetic Panel Type 1.	dard Panel Size:	1900 x 500 x 50mm) for the						
Please note that the colour of aluminium perforated sheet sho	uld be similar to t	he colour of steel posts.						
Please submit the schedule of material delivery to site.								
Status : Approved; Not appro	ved and resubmi	ssion required;						
Approved subject to condition(s) as stated /	further required in	nformation as stated.						
Approval not required. Others								
The Engineer's Representative :	Please specify) Date of Rei	sponse : 14 July 2010						
Terry Siu								

c.c. AECOM - Mr. Kelvin Cheng

TS/TL/SN/cw

Transportation Noise Barriers

Highways · Railroads · Buses · Airports · Light Rail Vehicles · Subways · Elevated Systems



Freestanding Barriers

Noise Barriers Types : FS, HB and HBS Barriers – sound absorptive on one and two sides respectively – optimize sound transmission losses and sound absorbing properties in a durable and attractive wall system in harmony with the community. Excellent low frequency absorption for heavy vehicles.

- Laboratory-rated sound absorption on one or both sides.
- Low weight, rugged construction ideal for wall or roof mounting.
- 125mm thick modular system in steel or aluminium.
- Abuse resistant powder coated galvanized steel or aluminium construction.
- Readily relocated in the event of expansion or the re-use in other projects.
- Withstand wind load up to 4.23 KPa (max. 3m) designs for specific wind loads are available.

- Galvanized Steel or Aluminium
- Free-Draining
- Light Weight
- Easily Installed
- Sound Absorptive
- Weather-Tested Finishes
- Freestanding or Add-on Cladding
- Horizontal or Vertical Installation
- Architectural Aesthetics





Noise Barrier system Finishes

Noise Barriers are finished with a tough, thermosetting, polyester powder coating. A wide variety of standard colors allows complementary decorative schemes and attractive designs to reduce apparent wall height as perceived by the community and motorists.

- Salt spray tested for checking, blistering, loss or adhesion, or evidence of corrosion per ASTM B 117 for 3000 hours without coating failure.
 - Tested for accelerated weathering per AAMA 2604-98 for 5 years Florida with colour change $\Delta E < 5$ and gloss retention > 30%.
- Optional facings include stucco and others





Contract No. HY/2009/17 Noise Absorptive Material

Industrial Acoustics Company...Making the World a Quieter Place Suite 1601, 148 Electric Road, North Point, Hong Kong. Tel : 852-25281138 Fax : 852-25291961 email : info@lachk.com

Configur	ation	TYPE FS/A	TYPE FS/A/1	TYPE HB/A	TYPE HBS/A Thickness 125mm
Weight (kg/m ²) Aluminium		10.70	24.50	12.20	25.40
Applica	tion	Freestand	ding alongside noisy e	quipment	Freestanding between multiple noise source

ACOUSTIC PERFORMANCE CHARACTERISTICS

1/1 Octave Band Center Frequency, Hz	125	250	500	1 K	2 K	4 K	STC /
SOUND TRANSMISSION LOSS DATA, dB (.)	9. 195		No the State			Rw
FS/A	14	19	27	33	38	39	31
FS/A/1	23	30	39	35	41	45	38
H B /A	14	17	24	32	36	43	29
HBS/A	14	15	22	40	48	53	27
	S. WR.				1. J. F. S.		
		No. Sala		Constant.		1	
SOUND ABSORPTION COEFFICIENT ()	THE T				184 C 101	- 15	NRC
FS/A	0.79	1.14	1.18	1.12	1.06	1.01	1.10
FS/A/1	0.66	1.07	1.12	1.06	1.04	0.97	1.05
H B /A	0.62	1.07	1.22	1.14	1.17	1.10	1.15
H B S / A	0.43	0.60	0.92	1.06	1.04	1.13	0.90
And the second and the second s				100.5			
				3 3 4 3	Barris and		
· All data in accordance with ISO Standard 1	40 or	ASTM	E90.				
All data in accordance with ASTM C423 or	ISO S	tandar	d 354.				

Specifications

Transportation Noise Barriers FS/A, FS/A/1, HB/A and HBS/A Module

1.0 GENERAL

1.1 Noise Barrier Modules shall be manufactured and installed with an acoustically absorptive surface, having guaranteed sound absorptive properties facing the predominant noise source. The barrier shall be constructed of vertical posts and polyester powder coated absorptive modules stacked to achieve the required wall heights. The pre-approved barrier system shall be Transportation NOISHELD Type : FS. HB and HBS as manufactured by Industrial Acoustics Company (H.K.) Ltd., Suite 1601, 148 Electric Road, North Point, Hong Kong.

1.2 Pre-bid submittals and approval shall include sample, structural calculations and wall design drawings: current test data illustrating compliance with the requirements of the acoustical and durability specifications for modules made on production line; proof of adequate manufacturing and financial capability consistent with project requirements; and a sample module made on production tooling.

2.0 DESIGN

2.1 Ground Mounted Barriers

2.1.1 Posts shall be spaced at 3000mm on center for steel posts, (plus concrete web thickness for concrete posts) consistent with the module spanning capability at the design wind pressure

2.2 Color, Module Patterns 2.2.1 Modules shall have a consistent color from module to module. A sample of each color to be supplied shall be submitted for approval prior to the start of manufacturing

2.2.2 Panels shall be stacked with joints aligned horizontally or joints may be uniformly stepped where the top or bottom of the wall change elevations. Barrier module color patterns shall be shown on shop drawings (using a legend keyed to color numbers)

2.3 Acoustical Characteristics

2.3.1 The barrier shall incorporate absorptive sound materials to prevent reverberation of noise between parallel walls, between vehicles and nearby sound barriers, and noise reflections to unshielded noise sensitive areas of the community.

3.0 MATERIALS

3.1 Modules shall be constructed of aluminium sheets manufactured in accordance with the requirements of AA1100 Specification, minimum 1.2mm solid side and 1.2mm perforated side. Modules shall be non-welded, free draining. Modules shall be coated in the factory with polyester powder coating applied through the use of an electrostatic charged and thermally bonded to the aluminium sheets.

3.2 Acoustic fill material shall be fiberglass, non-corrosive, resistant to be attacked by fungus, fire-resistant, vermin proof, and non-hygroscopic. Fill material shall be free draining, self supporting and shall retain physical and sound absorptive characteristics after long term exposure to the elements

Posts shall be galvanized steel meeting the requirements of BS729 and BS4360 3.3
 Grade 43A or approved equal.
 Color coating of posts shall be as required by the owner/architect.

 3.4
 Anchor bolts shall be stainless steel or approved equal.

 3.5
 Bearing blocks shall be EPDM, neoprene, or rubber, 60 durometer.

 3.6 Material Testing and Certification
 3.6.1 Acoustical testing
 3.6.1.1 Certified test reports shall be submitted to demonstrate compliance with the Sound Transmission Loss and Sound Absorption Coefficients specified. Tests have been conducted in a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) or HOKLAS.

(NVLAP) or HOKLAS. 3.6.1.2 Sound Absorption Coefficient Tests shall be performed in accordance with ASTM C423 or ISO 354.

3.6.1.3 Transmission Loss Tests shall be performed in accordance with ASTM E90 or ISO 140.

3.6.2 Module Testing 3.6.2.1 Fire properties of the panel shall be tested in accordance with ASTM E84-01 with the following results :

a) Flame Spread Index = 0 b) Smoke Developed Index ≈ 5

3.6.2.2 Salt spray tested for checking, blistering, loss or adhesion, or evidence of corrosion per ASTM B117 for 3000 hours without coating failure

3.6.2.3 Tested for accelerated weathering per AAMA 2604-98 for 5 year Florida with colour change $\Delta E < 5$ and gloss retention > 30%.

All designs and specifications subject to change without notice. Metric dimensions nominal



INDUSTRIAL ACOUSTICS COMPANY (H.K.) LTD.

雅士消聲器材(香港)有限公司 Suite 1601, 148 Electric Road, North Point, Hong Kong Tel: (852) 2528 1138 Fax: (852) 2529 1961 E-mail address: Info@iachk.com Web Site: www.lachk.com



Calculation the weight of 50mm thick panel

	panel size	1900x500 =	0.95	m2	
Mate 1)	erial 3mm thick aluminium sheet 1900x500	Area 0.95	m2	Weight 7.84	kg
2)	1.0mm thick Aluminium perforated sheet 1900x700 (36% Opening)	1.33	m2	2.3408	kg
3)	1.0mm thick Aluminium End U	0.1	m2	0.275	kg
4)	50mm Thk. 60kg/m3 Rockwool	0.95	m2	2.85	kg
5)	Others (Pop revit and screws)			0.15	kg
		Total		13.4533	kg
		Unit Weight		14.16	kg/m2





	NOTES: 1. THIS DRAWING CONJUNCTION N 60095653/FEH	SHALL BE READ IN WITH AECOM'S DWG. NO. D/1107A, 1108A.
100 MU		
		-
COUSTIC PANEL	INDUSTRIA HONG KON 推士清集	L ACOUSTICS COMPANY NG LIMITED 器材 (香港)有限公司
. PLATE	PROJECT: CONTRACTOR NO CENTRAL – WAI FEHD WHITFIELD RE-PROVISIONIN	0. HY/2009/17 N CHAI BYPASS D DEPOT IG WORKS
	TITLE: LAYOUT AND OF ACOUSTIC	Fixing Detail Panel
	drawn by: SHL	DESIGNED BY: FML
	SCALE: AS SHOWNOA3	CHECKED BY: FML
	DRAWING NO:	9-JUL-2010
	EW-2009/17-AP	-D001



AECOM 8/F, Grand Central Plaza, Tower 2, +8 138 Shatin Rural Committee Road, Shatin, Hong Kong 香港新界沙田鄉事會路 138 號 新城市中央廣場第2座8樓 www.aecom.com

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Your Ref. : CHEC-CRBCJV/C-257/01.01/000243, CGS/000016/A Our Ref. : CWB/(HY/2009/11)/M25/110/B000.207

10 March 2010

Mr. Daniel Cheung China Harbour Engineering Company Limited -China Road and Bridge Corporation Joint Venture 19th Floor, China Harbour Building 370-374 King's Road North Point Hong Kong

Dear Sirs,

Contract No. HY/2009/11 Central-Wan Chai Bypass - North Point Reclamation

Submission CGS/000016/A for Noise Absorptive Material

I refer to your above referenced submission dated 12 February 2010 and your subsequent letter dated 5 March 2010 enclosing the manufacturer's testing report on the proposed Forster F2 absorptive panel.

Since the report shows that the absorptive panel can absorb 12 dB noise intensity which meets the EIA noise reduction requirement of 10dB, I have no further comment on their use for the special hoarding of this project.

Yours faithfully, For and on behalf of AECOM Asia Co. Ltd.

Terry Siu Engineer's Representative Transportation

C.C. AECOM - Attn : Mr. Kelvin Cheng

TS/ TL/SN/mt

Forster Metallbau Gesellschaft m. b. H. P.O. Box 176, Weyrer Strasse 135 A-3340 Waldhofen/Ybbs, Austria

Tel. (0) 74 42 / 501 - 0 e-mail: forster@forster.et Fax (0) 74 42 / 501 - 100 http://www.forster.at



highly absorbing aluminium cladding panel type F2



Types:

F2/1,25 sheet thickness 1,25 mm

Material:

Aluminium, polyester-powder-coated

Description:

Aluminium cladding panel, highly absorbing, for cladding of reflecting walls, according to EN 1793-1, ZTV-LSW 06 and CE-label acc. to EN 14388.

Absorbing panel: 40 mm thick rockwool with 100 kg/m³, front side covered with black glass fleece (hydrophobic).

Front panel crimped for stiffening and profiled.

Characteristic values:

L	 sound absorption acc. EN 1793-1
	 DL, dB
L	min. 9 (A3)

15.04.2008

Subject to technical alteration

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Contract No. HY/2009/11 Noise Absorptive Material

Standard size : 1960mm x 500mm x 45mm



隔音材料

GOODLY隔音毯

- 1. 面積密度: / 2.1Kg/m' / · 厚度: 1.5m/m 、 /
 - 寬度? (0.9m.
- 2. 標準長度: 10m 耐燃度: 200℃.
- 3. 特性: 音響透過 STC-21. 抗拉强度為 9.56MPa, 延伸率為 143.1%,可 承受抗擊力為 88.8N. 不阻礙電波傳達,具柔 軟性,可任意剪裁,可配合各種施工方法,(如 膠合,壓合)等.
- 4. 組合成份: 聚乙稀加無機礦物粉,加不銹鋼 金圈纖維.
- 5.、可適用於工業廠房、空調機房、汽車、音響 室、KTV、音樂教室等.

sa isti		A SÍT	M 墼		則結	泉 表:	
	125	250	500	1000	2000	4000	STC
GL-2215	12	12	16	22	27	32	21





輕鋼架天花系統貼上 Goodly隔音毯

將Goodly隔音毯裁剪成與天花板大小相 同之形狀。用膠貼方式貼在板材之背面, 再放回已完成之輕網架上,在燈具背面亦 用同樣方法貼上Goodly隔音毯,而空關 風管亦採用相同方式貼在風管四周即可。 完成後可降低將來天花噪音量30dB.

Goodly隔音毯贴在天花板上

Goodly 隔音毯貼在燈具上

輕鋼架結構體

GOODLY®隔音毯施工法:

協問骨な

Goodly隔音毯

内貼Goodly隔音毯

先在已完成之單面板材上用膠貼或風壓 釘方式,把Goodly隔音毯固定在板材上 (黑色為面), 西需貼向嗓音來源點, 再封 釘另一片板材即可, 再用粉刷漆上顏色 或貼上壁紙修飾, 完成后隔音量可達 30dB

木結構體

Goodly隔音毯

磁鐵天花板

Goodly隔音毯

木作天花板貼上 Goodly隔音毯

在木天花板第一層板材完成後,用膠貼或 風壓釘把Goodly隔音毯固定在板面上(黑色為面),需面向噪音來源點、後再 對釘另一面板材即可,再用粉刷或漆上 顏色或貼上壁纸修飾。完成後可隔絕由 上層所產生之嗓音量為40dB

隔音板材

水泥、磚塊或木地板 貼上Goodly隔音毯

先將原地面打掃乾淨,吸掉地面一切灰塵 並吹乾地面,使表面乾燥後,再用白膠或 强力膠塗滿地面,另在Goodly隔音毯底部 (黑色為面)面需貼向噪音來源點, 同樣塗滿膠貼物,待膠貼物1/3乾後,鋪貼 在地面上即可,最後再舖上地發或木地板 便完成。完工後隔音量可達40dB。 木製地板或鋪地毯 🗋

水泥地板

現代人

一直追求一個高品質的生活環境, 除在物質上的滿足外,我們更需要一個寧靜的居家休息環境。 但是在現實生活與工作中,我們常受到不同程度的噪音污染,如: 工廠的機械噪音。辦公室的空調馬達聲音、

查腦主機、打字的聲音或在戶外活動時的機動車輛、攤販叫賣聲、

甚至速回家休息時,從鄰居家發出的音響聲、

電視、小朋友練琴聲....等等。

這些噪音對我們的情緒、心情、聽覺和心臟都會帶來 身心健康的影響。

GOODLY隔音毯能帮助您有效解决嗓音的問题, 讓您有一個舒適、寧静的休息空間。



KINETICS NOISE CONTROL (ASIA) LTD.

香港官塘巧明街 95 號世達中心 9 樓 E 室 Unit E, 9/F., World Tech Centre, 95 How Ming Street, Kwun Tong, Hong Kong Tel: (852) 2191 2488 Fax: (852) 2191 2477 E-mail: fchan@kineticsnoise.com www.kineticsnoise.com

中國内地經銷商:

東莞聯華五金制品有限公司 地址:東莞市虎門鎮龍眼管理區 Tel: 86-769-85551248 85554024 Fax: 86-769-85551848 E-mail:luenwah@hkstar.com



NOISE MANAGEMENT PLAN

For

Contract No.: HY/2009/19

Central – Wan Chai Bypass Tunnel (North Point Section) and Island Eastern Corridor Link

Appendix F

Site layout Plan

